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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,067	09/12/2003	Vladimir Pavlovie	200308305-2	1940

7590 10/15/2004

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EXAMINER	
AZARIAN, SEYED H	
ART UNIT	**PAPER NUMBER**
2625	

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/662,067	**Applicant(s)** PAVLOVIE ET AL.	
	Examiner Seyed Azarian	**Art Unit** 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 January 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12 September 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 1/29/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-31, rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1, of U.S. Patent No. 6,683,968. Each of the limitation set forth in the claims of the instant application is defined in the claim of the patent.

As an example consider claim 1, of current application, compared to claim 1, of U.S. Patent No. 6,683,968 it disclose program code that modeling the target with a switching linear dynamic system (SLDS) comprising a plurality of dynamic models (column 34, lines 28-30);

That associating each dynamic model with a switching state such that a model is selected when its associated switching state is true (column 34, lines 31-34);

determining, for a given measurement, and for each possible switching state, a set of continuous state estimates (column 34, lines 35-37);

determining a state transition record by determining and recording, for a given measurement and for each possible switching state, an optimal previous switching state, based on the measurement sequence, wherein the optimal previous switching state optimizes a transition probability based on the set of continuous state estimates (column 34, lines 38-44);

fitting a measurement model of the target to the measurement sequence (column 34, lines 45-47);

and estimating a trajectory responsive to fitting the measurement model, the state transition record and SLDS parameters, said estimated trajectory comprising a sequence of continuous state estimates of the target corresponding to the measurement sequence (column 34, lines 45-51).

The other claims have similar correspondence to the patent application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Cham et al (U.S. patent 6,226,409).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Cham et al discloses a method for tracking a target in a sequence of measurements, comprising, modeling the target with a switching linear dynamic system (SLDS) comprising a plurality of dynamic models (column 4, lines 53-62, the detectors could be a radar tracking system and column 6, lines 51-54, refer to application of dynamic model);

associating each dynamic model with a switching state such that a model is selected when its associated switching state is true (column 19, lines 32-43, flow chart 21004, illustrates the tracking problem and sequential Markov decision);

determining, for a given measurement, and for each possible switching state, a set of continuous state estimates (column 7, lines 1-8, any object being tracked continues to move, and (Fig. 14, column 18, lines 37-48, Markov decision which involve updating a probability distribution through a series of measurement);

determining a state transition record by determining and recording, for a given measurement and for each possible switching state, optimal previous switching state

optimizes transition probability based on the set of continuous state estimates (column 8, lines 1-10, a dynamical model is applied to the modes of the posterior distribution of the previous time frame to predict the new location);

fitting a measurement model of the target to the measurement sequence (column 12, lines 53-64, image 1004 is computed from a model of a target);

estimating a trajectory responsive to fitting the measurement model, the state transition record and SLDS parameters, said estimated trajectory comprising a sequence of continuous state estimates of the target corresponding to the measurement sequence (column 16, lines 46-67, and column 7, lines 9-20, use of Bayes' formula based on the last recorded frame at different time).

Regarding claim 2, Cham et al discloses the method of Claim 1, wherein the set of continuous state estimates is obtained through Viterbi prediction (Fig. 20, column 19, line 56 through column 20, line 5, the sequential Markov decision).

Regarding claim 3, Cham et al discloses the method of Claim 2, wherein the optimal previous switching state is an optimal prior switching state (column 8, lines 1-10, a dynamical model is applied to the modes of the posterior distribution of the previous time frame to predict the new location).

Regarding claim 4, Cham et al discloses the method of Claim 3, wherein the transition probability is dependent only upon Markov process probabilities (Fig. 14, column 18, lines 37-48, Markov decision which involve updating a probability distribution through a series of measurement).

Regarding claim 5, Cham et al discloses the method of Claim 2, wherein the optimal previous switching state is an optimal posterior switching state (column 8, lines 1-10, a dynamical model is applied to the modes of the posterior distribution of the previous time frame to predict the new location).

Regarding claim 6, Cham et al discloses The method of claim 1, wherein the set of continuous state estimates is obtained by combining Viterbi predictions with samples drawn at random according to a continuous state sampling density (see claim 2, also column 8, lines 31-59, sampling).

Regarding claim 11, Cham et al discloses the method of Claim 6, wherein the set of continuous state estimates is updated, responsive to the given measurement, and the optimal previous switching state optimizes a posterior transition probability over the updated set of state estimates (Fig. 2, column 5, lines 53-65, tracking algorithm and as a result of the comparison, the state is updated).

Regarding claim 12, Cham et al discloses the method of Claim 11, wherein the samples from a continuous state sampling density are updated by a gradient descent procedure (column 6, lines 51-65, calculating from posterior function by application of the dynamic model and column 8, lines 26-30, performing a gradient).

Regarding claim 13, Cham et al discloses the method of Claim 11, wherein samples from a continuous state sampling density are updated by linearizing around sample positions and applying an Iterated Extended Kalman Filter (column 2, lines 1-7, Kalman filtering).

Regarding claim 14, Cham et al discloses the method of Claim 1, wherein the measurement sequence comprises an image sequence, and wherein the transition probability is responsive to the comparison between an image feature model and the given image measurement (Fig. 2, column 5, lines 53-65, sequence of comparison and state update repeated).

Regarding claim 15, Cham et al discloses the method of Claim 14, wherein the image feature model is a template model (column 17, lines 22-35, template matching).

Regarding claim 16, Cham et al discloses the method of Claim 14, wherein the image feature model is a contour model (column 16, lines 56-63, based on a simple shape such as an oval refer to contour).

Regarding claim 17, Cham et al discloses the method of Claim 1, wherein the SLDS model models motion of a human figure (Fig. 16, column 14, lines 18-24, Fig. 16, human figure).

Regarding claim 18, Cham et al discloses the method of Claim 17, wherein the SLDS model is learned from training data of figure motion (column 4, lines 53-61, sequence of frame indicating motion).

Regarding claim 19, Cham et al discloses the method of Claim 1, wherein the SLDS model models motion of a human face (Fig. 20, column 16, lines 55-67, model having more detail such as eyes nose, mouth that can fit features of increasing detail).

Regarding claim 20, Cham et al discloses the method of Claim 19, wherein the SLDS model is learned from training data of facial motion (column 17, lines 9-17, the existence of facial features).

Regarding claim 21, Cham et al discloses the method of Claim 1, wherein the SLDS model models the evolution of acoustic features in a speech waveform (column 14, lines 1-12, evolution of the motion).

Regarding claim 26, Cham et al discloses a computer program product for determining, given a set of possible switching states and responsive to a sequence measurements, a corresponding sequence of switching states for a system comprising a plurality of dynamic modes, computer usable medium having computer readable code (See claim 1, also Fig. 22, column 20, lines 6-24, the computer system, and read data from memory 22004).

Regarding claim 27, Cham et al discloses a computer system comprising: a processor; a memory system connected to the processor; and a computer program, in the memory, which models the target with a switching linear dynamic system (SLDS) comprising a plurality of dynamic models (see claim 1, and Fig. 22, column 20, lines 6-14, the computer system, Central Processor Unit and memory 22004).

Regarding claim 31, Cham et al discloses the system of Claim 30, further comprising: a sample generator which, responsive to the generated continuous state predictions, produces a new set of prediction samples; and a multiple hypothesis tracking (MHT) module, which, responsive to the sample generator, generates a set of estimates using a standard gradient descent algorithm, wherein the selector is additionally responsive to the MHT module (Fig. 3 and Fig. 5A, column 1-9, block diagram of a multiple-hypothesis tracking algorithm).

Regarding claims 9-10, recites similar limitation as claims 2 and 6, are similarly analyzed.

Regarding claims 7 and 8, recites similar limitation as claims 3 and 5, are similarly analyzed.

Regarding claims 22-24, recites similar limitation as claims 20 and 21, are similarly analyzed.

Regarding claims 25, and 28-30, recites similar limitation as claims 1, 6 and 11, are similarly analyzed.

Other prior art cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. patent (6,064,703) to Cusani et al is cited for map receiver for high-speed numerical transmissions through rayleigh channels noisy and dispersive in time and frequency.

U.S. patent (6,256,418) to Rehg et al is cited for method and system for compressing a sequence of images including a moving figure.

U.S. patent (6,480,876) to Rehg et al is cited for system for integrating task and data parallelism in dynamic applications.

U.S. patent (5,923,712) to Leyendecker et al is cited for method and apparatus for linear transmission by direct inverse modeling.

U.S. patent (5,325,098) to Blair et al is cited for interacting multiple bias model filter system for tracking maneuvering targets.

U.S. patent (6,396,878) to Piirainen is cited for reception method and a receiver.

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Azarian whose telephone number is (703) 306-5907. The examiner can normally be reached on Monday through Thursday from 6:00 a.m. to 7:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached at (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.
Status information about the PAIR system, see http:// pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seyed Azarian
Patent Examiner
Group Art Unit 2625
September 22, 2004

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